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CONSTRUCTION AND EQUIPMENT

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CONSTRUCTION

MINISTER DISCUSSES CONSTRUCTION FINANCE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 27 Aug 80 p 2

[Article by: I. Antonovich, minister of Belorussian SSR Installation and Special Construction Work: "What the Experiment Has Shown"]

[Text] Belorussian construction workers and assemblers are working for the fifth year under the conditions of an experiment for which economic methods were set as a basis of organizing and managing production. The volume of completely finished work at starting enterprises, complexes and structures--that is, construction commodity production--has become the main evaluation index. Others depend on this index--profit and funds for economic incentive.

What kind of potentials has the experiment helped to bring into play? What have we achieved, what hindered our work and why?

New methods contribute to a reduction in construction times, to an improvement in its quality and to a reduction in cost. Due to a reduction by more than one quarter of structures that are simultaneously under construction in the republic, the concentration of construction and assembly production, material and labor resources has increased. The duration of construction decreased on the average by 12 percent and the relative proportion of "in-completed work" was reduced. As to the Ministry of Installation and Special Construction directly, the basic index--the plan for commodity production for 4 years--was completed 101.8 percent. Calculations for completely finished structures, capacities that have been turned over and extension of credit for "incompleted work" instead of advance funds were aimed and are aimed at accelerating the work being conducted. Thus, many structures were turned over ahead of schedule.

The plans for the engineering preparation of production that are formulated annually have become the organizational beginning. Transportation control and weekly-daily planning has been significantly improved. Effective forms of control over construction have been developed and adopted. Information concerning the pace of work on the site and management level are entered on a punch card and sent to the trusts and ministry where it is discussed and analyzed. In addition, a supplementary control has been established

for especially important structures. Reactors, in particular, are such structures for us. A single schedule in stages for all organizations has been formulated for their assembly at unprecedented rates. The pace of completing the schedule is reviewed weekly at production and transportation control meetings in the ministry.

Among our foremost concerns is to increase the level of industrialization for assembly production (it reached 88 percent in manufacturing metal structures and 80 percent for sanitation engineering equipment). With this aim we are developing an industrial-production base at unprecedented rates, and we are erecting new and reconstructing operating enterprises.

The experiment created favorable conditions for adaption of the brigade contract method on a massive scale. Six out of each ten crews are now working according to the Zlobinsk method. And what is more a new form of crew cost accounting has found extensive use at republic construction sites. In addition to an agreement with their management, all low level collectives that participate in construction at the same site conclude agreements among themselves and take specific obligations upon themselves for the completion of tasks ahead of schedule and for providing associated workers with a working front. The complex brigade contract method proved highly effective. Thanks to coordination and accuracy in the work of the associated workers a large decorative tile shop in the "Minsk Building Materials" Enterprise, new capacities at the Minsk fine fabric combine and other structures were put into operation ahead of schedule.

With the transition of the ministry to cost accounting its structure has been improved. Divisions for new technology, scientific research, estimates, costs, contracts, and revision control have emerged.

Yet just the same, it must be acknowledged that the efficiency which has been achieved is not as high as it might be. Why? Not all the principles and conditions of the experiment have become a rule for every construction participant. The paramount problem--planning capital investments--has not been solved to the end. While transferring to new operating conditions we nonetheless were forced to operate according to the old system in many ways. Up to now a two-year planning system has not been worked out, not to mention the five-year plan with tasks distributed among the years. The plan for the 10th Five-Year Plan, for example, was formulated without approval by the general contractors and subcontractors and was not coordinated with existing material and personnel resources. This, obviously, has not allowed capabilities to be effectively used.

Unfortunately, the commodity production index (this is not the first time that this is being said) has become the primary one only for construction workers and assemblers. And what of clients--equal participants in construction? It has not acquired the force of law for them and therefore they are reorganizing slowly. As is well known to us, union ministries of the chemical

industry, the machine tool and tool industries, light industry and a number of republic departments continue to plan capital investments without taking into consideration new requirements and orienting themselves toward the fourth quarter. Thus, crash work and rush work, as before, are contained in the plans which lowers the quality of work and does not make it possible to form normal technological stockpiling. In addition, such a practice significantly reduces our financial position--as the realization of commodity production is negligible during the first quarters, funds for economic incentive and profits are correspondingly small.

Better contacts by the republic Ministry of Industrial Construction's subdivisions with general contractors remains desirable. As before assembly organizations are not actively enlisted to develop drafts for two-year plans and to conclude general contracts for the entire period of construction. As a result the deadlines for distributing technical documentation and delivering equipment are late in being met. Because of this we are deprived of the possibility of more carefully preparing for work.

It was specified by the experiment that the financing and credit mechanism, which is the core of the entire complex of measures for improving planning, organization and management of production, will become an effective tool for upgrading our work. Indeed, as it has already been noted, calculations for finished structures and extension of credit instead of advance payments continually prompt us to "head towards" a quick start up of capacities. However, experience has revealed a number of negative instances. Which, namely? The influence of the financing and credit mechanism is one sided. It "punishes" only construction workers and assemblers but does not affect clients. Thus, for four years of the five-year plan we paid the bank (percentages for the use of credit including increased standards for structures that are not put into operation on time) more than 7 million rubles. And who is at fault for the failures? Most of all the clients although they did not incur any loss, for this was not specified by the conditions of the experiment. Such a system is hardly correct. The financial responsibility of all participants in construction should be identical. And if a particular structure is not put into operation due to the fault of the client he should be answerable for this with rubles.

As soon as the topic turned to finances this must be said in that regard. From the beginning of the experiment a term appeared among us--unrealized profit. It is comprised of the difference between the estimated and actual cost of incompleting production. What does this mean? The structure is still under construction and the unrealized profit has been included in our plans and we must use it to cover all sorts of expenses. That is, use that which is not yet available--the structure, after all, has not been turned over.

More than four years of experience has convinced us of the fact that this index does not correspond to new methods of operation. What is obtained? The more construction that remains for a structure the greater the unrealized

profit. And conversely the quicker the assemblers turn over capacities the less it is. Here is an example. During the past year the "Promtekhmontazh" Production Association overfulfilled the plan for commodity production by 5 million rubles, having reduced thereby the "incompleted work." It turned out, paradoxical as it may be, that the collective that did fine work received no praise or honor--they failed to receive almost one and a half million rubles of unrealized profit and for this reason did not have their own working capital. It turns out that it is not very profitable to reduce "incompleted work." But it was for the quick start up of capacities towards which the experiment itself was directed. It appears that an interdepartmental commission on new methods of planning under the Union Gosplan should take into consideration the experience of Belorussian builders and exclude unrealized profit from the quantity of indices established for us. Balanced profit obtained from fulfilling the plan for commodity production can be a source for covering expenditures.

We are speaking today about the lessons of the experiment because from next year on the activities of all construction and assembly organizations must be planned and evaluated in strict accordance with the requirements of the CPSU Central Committee and USSR Council of Ministers' decree concerning an improvement in the economic mechanism and it is already important now to have a precise five-year plan with tasks distributed among the years and balanced with the capabilities and material and technological resources of construction and assembly organizations. Firm plans for commodity production and the maximum limits instead of total amounts of capital expenditures also must be established for our clients. On this basis the mutual responsibility for putting capacities into operation on time will also be increased.

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CONSTRUCTION

FINANCIAL ASPECTS OF CONSTRUCTION INDUSTRY DISCUSSED

Better Design, Estimate Work

Moscow FINANSY SSSR in Russian No 5, 1980 pp 25-28

[Article by Candidate of Economic Sciences K. G. Fedorenko, deputy manager of the Ukrainian Office of the USSR Stroybank: "Strengthening Control Over the Quality of Design and Estimate Specifications"]

[Text] The 25th CPSU Congress and the subsequent plenums of the CPSU Central Committee focused attention on capital construction problems with the ways for solving these problems being clearly spelled out in the decree approved by the CPSU Central Committee and the USSR Council of Ministers entitled "On Improving Planning and Strengthening the Effect of the Economic Mechanism on Improving Production Efficiency and Work Quality." Without taking up all of the ways, let us examine one of them, the importance of the quality of design and estimate specifications and the feasibility studies (TEO). Their role in raising the effectiveness of capital investments in the above-indicated decree has been defined in a completely new manner. In particular it has been pointed out that changes in the indicators for title lists can be made only in a revision of the plans involving the use of more advanced equipment and progressive production methods. In these instances an adjustment of the estimated cost and the capital investment cost is permitted within the limits of the latter and the construction-installation work set for the corresponding year for the ministry and department as well as for the Union republic council of ministers. Such demands raise the responsibility of the clients, the designers, the expert bodies and the financing bank for the quality of the design specifications and the stability of the estimated cost.

The selective checks carried out by the bank on the quality of the designs and estimates for building industrial enterprises and housing and civil projects help to correctly determine the estimated cost on the basis of which capital investment planning is carried out, construction is financed and payments are made between the clients and the contracting organizations for completed work. Control over the quality of the estimate specifications is particularly important since now the estimate is the basis for

strengthening cost accounting and assessing the operations of the construction and installation organizations. It is carried out in the banking institutions of the Ukrainian Republic Office in many areas.

The greatest importance is given to checking the designs and summary estimates for the preliminary (single-stage) designs, since precisely they determine the technical and economic indicators for construction and its final cost. The financing banks inspect the quality of these estimates for all construction projects. Great attention is given to the project estimates. Each year from 20,000 to 25,000 of them are inspected. As a result, over the years of the Ninth Five-Year Plan, the estimated cost at Ukrainian construction projects was reduced by 1.02 billion rubles, and over the 3 years of the Tenth Five-Year Plan, by 1.16 billion rubles.

In checking the summary estimates and the summary estimate-financial calculations, the bank employees first seek out reserves for reducing the estimated cost of construction, disclosing deviations from the regulatory documents and eliminating surpluses and violations committed in determining the limited, normed and other estimate expenditures and the designing standards. For example, the design organizations and clients in revising the design specifications for individual projects restored a previously used reserve and included in the summary estimate and financial calculations a reserve for unforeseen work and expenditures in amounts set for the preliminary designs, and incorrectly recalculated the amount of the reserve after the instructions of the USSR Gosstroy on the procedure for calculating the limit funds for unforeseen expenditures and work. The exclusion of these violations made it possible to reduce the estimated cost of building projects at the Svema Production Association in the town of Shostka by 5.7 million rubles, and by 3.3 million rubles at the Makeyevka Pipe Casting Plant of the USSR Ministry of Ferrous Metallurgy.

Significant deviations from the current standards have been disclosed by bank employees in checking the correctness of setting expenditures on temporary buildings and installations. By excluding excess expenditures provided in the estimates, the estimated cost of many projects was reduced, including by 849,000 rubles for the United Mine of the Pervomayskiy Administration of the USSR Ministry of Ferrous Metallurgy, by 397,000 rubles at the Gvardeyskaya Mine of the Ore Administration imeni R. Luxemburg of the same ministry, and so forth.

As an analysis of the quality of the estimates shows, unfortunately, in many instances a firm and final price has not been set for the project. Such a conclusion is also substantiated by the results of studying the reasons for the increased estimated cost of many projects during the construction period. Over the years of the Ninth Five-Year Plan, the Stroybank institutions investigated the reasons for a 35-percent increase in the estimated cost of 677 union, union republic, republic and local construction projects. For 230 construction projects, the increased costs were not accompanied by a rise in the designed capacity or by the organization of new types of production, and could not be explained by other objective factors

substantiating the validity of the change. As an example of such construction projects, we might mention the mechanized commercial laundry in L'vov, where the increase in the estimated cost was 78 percent, the Voroshilovgrad special furniture repair enterprise with 48 percent, and other industrial projects.

At 260 projects, in reviewing the design and estimate specifications, there was an increase in capacity or new types of products were envisaged, but here in a majority of instances, the rise in increased costs was not proportional to the growth of capacity. Among such projects were the reconstruction of the Kherson DSK [housing construction combine] (the increase in capacity was 14 percent, but costs rose by 165 percent), the tin- and lead-plating shop at the Nizhnedneprovsk Metallurgical Plant imeni Komin-tern (respectively, 60 and 163 percent), the Lisichansk Brewery (17.5 and 74 percent), and so forth. All of this is explained, as a rule, by the incorrect setting of the initial cost, by the unsound selection of design decisions, by mistakes in the initial data and calculations, by incorporating projects not bearing on the given construction, by changes in prices for equipment, and so forth.

It is possible to establish three basic groups of reasons for the increased estimated cost during the construction period. In the first are those related to a revision of the design decisions, in the second, the incorrect setting of the initial estimated cost, and in the third, the extended construction times causing changes in the technical conditions and even the design standards. In 1976 alone, the Stroybank institutions analyzed the design and estimate specifications for 126 construction projects in which the estimated cost increased by 31.6 percent over the initial one, and in 1978, 136 projects (an increase of 28.1 percent), including 106 production projects (an increase of 27.8 percent).

One is struck by the fact that in 50 percent the increased estimated cost occurred due to an increase in the capacity of the enterprises, however the technical and economic indicators simultaneously deteriorated. This is explained by the fact that often the estimated cost is unjustifiably understated in the designing stage. Expenditures on production and other equipment are incorrectly determined, insufficiently sound initial data are used for water, power, heat and gas supply, and expenditures have not been included or have been understated for building treatment plants and carrying out other ecological measures.

At the same time, unjustified excesses are often allowed in rectifying the previously committed mistakes and errors. The following construction projects could serve as characteristic examples. The USSR Ministry of Light Industry reapproved the plans and the estimate summary for the construction of the Cherkassky Silk Textile Combine, after which the initially approved estimated cost was increased by 29.7 million rubles, including by 25.3 million rubles for production projects. A study showed that 5.7 million rubles of the increased estimate was caused by making changes for the purpose of increasing production efficiency and raising product output

approximately 15 percent. The remaining increase was due to the additional incorporation of 15 new projects in the plans, to incorporating changes in individual design decisions, their replacement and the increased cost of the production and engineering equipment.

The USSR Ministry of Ferrous Metallurgy reapproved the construction plans for the tin- and lead-plating shop at the Kizhneinoprovs Metallurgical Plant (Kremnitsynsk), having increased the initial capacity by 60 percent. At the same time the estimated cost rose from 4.7 million rubles up to 12.4 million rubles, or by 163 percent, and the basic technical and economic indicators declined sharply. And 35.5 percent of the increased estimated cost had been caused by initial miscalculations by the general designer Giprosmet (State Union Institute for the Designing of Metallurgical Plants) of the USSR Ministry of Ferrous Metallurgy which had omitted projects essential for the operation of the shop in the plans, including: the oxygen system and personnel facilities, as well as a portion of the installations for water supply, sewage, and so forth.

Often even after revising the approved decisions, the design organizations make many changes which increase the estimated cost. For example, the Khar'kov Institute Giprostal' (Design Institute for Steel), for just one starting-up installation at the oxygen station of the Karmir Plant (the city of Khar'kov) incorporated in the plans 319 changes and additional drawings which caused not only an increase in construction cost but also wasted expenditures on executed construction work.

The Slavuta malt plant in Kmel'nitskaya Oblast has been under construction since 1968 under plans of Ukrghipropishcheprom (Ukrainian Design Institute for the Food Industry) under a title list approved by the USSR Gosplan with a capacity of 40,000 tons of malt a year. The initially approved plans were reviewed in 1970, after which the capacity of the enterprise was doubled, while the estimated cost rose by 4-fold, that is, the technical and economic indicators declined by 2-fold. Moreover, due to mistakes in the initial revision of the plans, in 1978 they were revised a second time without a change in the capacity, but with a new increase of 4.8 million rubles in costs.

The basic reserves for increasing capital investment effectiveness are to be found in approving the design decisions. Here one understands a range of questions involving a thorough establishing of the economic advisability of construction in the predesign stage and high-quality engineering and construction designing. The optimality of the elaborated variation of the plans is determined by the technical and economic indicators. For this reason the bank institutions in the Tenth Five-Year Plan are paying special attention to accumulating and studying the technical and economic indicators, as well as elaborating proposals to improve them.

In checking the quality of design and estimate specifications, the bank gives great importance to seeking out reserves for lowering estimated costs and raising capital investment effectiveness. Thus, in analyzing

The savings estimated for 1976, 1977 and 1978 alone, a reduction of 405.0 million rubles in the estimated costs was achieved. In 1978, this reduction proposed by the bank and accepted by the clients was due to the following factors:

Factors for reducing estimated construction cost	Total (1978 rubles)	Percentage of Total of Accepted Reduction
Exclusion of projects	29,667	30.8
Reduction in limit expenditures	22,421	23.4
Incorrect calculation of amount of work in estimates	12,184	12.6
Decline in equipment cost	8,337	8.7
Incorrect use of unified rates and other estimate standards	2,841	3.0
Incorrect arithmetical mistakes	821	0.6
Eliminating violations of designing standards	383	0.4
Reducing overhead rates	1,122	1.2
Eliminating expenses in finishing and equipment	248	0.3
Other factors	17,392	18.1
Total	74,335	100.0

The given data show that the estimated cost was reduced chiefly by excluding projects the construction of which was not essential for economic or production factors, and to reducing limited expenditures. At the same time it must be pointed out that by a more careful check of the amount of work, expenditures for this item in 1976 were reduced by 12.4 points in comparison with 1975. In 1978, as a result of such a check, proposals were made to reduce estimated costs by 132.9 million rubles, and 96.3 million rubles were realized.

In 1976, as in the subsequent years of the Tenth Five-Year Plan, the Ukrainian Republic Statebank Office, for the purpose of seeking out additional reserves, has made an integrated study of the technical and economic indicators in the designing stage. Engineers and economists from the bank were involved in this. Such an approach has provided good results both in the designing and construction stage as well as after the capacity is in operation. The obtained results were used by the bank for further strengthening control in the earliest stages of the investment process. While in 1975, 7.9 million rubles were saved by proposals of the bank engineers in the designing stage, in 1976, the figure was 43.4 million rubles, and in 1978, 104 million rubles.

On November 14 the Director of the State Civil Engineering Institute of the USSR Academy of Sciences, who has also been working with the client organizations. The Ministry and departments should now work out measures which will bring about a reduction in the estimated cost of the projects which are being carried over into the Tenth Five-Year Plan as well as approve amendments for revising the design and estimate specifications for the projects involved on Ukrainian territory. Control has also been established over the submitting of items scheduled from them, as well as the actual results from passing the estimated cost of the projects.

Due to the fact that the ministries and departments have drawn out this work, the Ukrainian Program Office together with the Ukrainian Ministry has proposed that the appropriate measures be taken. The office has sent out the amendments received from the ministries and departments for control to the banking institutions financing the projects at the spot. Due to these measures, over the 3 years of the five-year plan, estimated costs have been reduced by 1.1 percent.

An analysis of the materials obtained from the clients shows that estimated costs have been noticeably reduced also by excluding from the estimates the expenditures and outlays not stipulated by the current standards, instructions and provisions of the USSR Ministry. In the estimates for individual projects there have been excesses in the exterior and interior finishing of the buildings, the overstating of the amount of work and individual standards, the incorrect application of rates, and so forth.

The increased estimated costs in the construction period ultimately extend the time for completing the enterprises, thus reducing capital investment effectiveness. For example, in line with the increased estimated cost of 200 million rubles for the First and Asbestos-Submer Products Production Association in the Kiev P'yskiv KPS, the L'vivskansk and Kremenchuk oil refineries, as well as due to the unsatisfactory fulfillment of the capital investment plan, the dates for completing these projects were shifted in 1977. Initially they had been set, respectively, for 1975, 1976 and 1977.

Approximately the same situation has developed at the projects of the Ministry of Chemical Industry located on Ukrainian territory. During the last five-year plan, the plan for completing the capacity and fixed capital was not fulfilled, as funds were not provided to cover the committed increase in estimated costs. And in a number of instances the capacity of the construction organizations did not make it possible to carry out the increased amount of work related to this. For the 14 construction projects of the Ministry of the Chemical Industry inspected by the bank institutions, the increased costs had risen by 51.5 percent, including by 35.2 million rubles due to the incorrect initial setting of these costs.

Many shortcomings in designing can be explained by underestimating the importance of the feasibility studies. Designing is often carried out without the preliminary elaboration of the basic questions related to production methods or construction decisions and without an analysis of the

analogous indicators for the future enterprises. As a result, the planned indicators are often unreliable, and the estimated cost subsequently can markedly surpass the originally planned capital investments.

Individual ministries and departments, in order to obtain permission for construction, intentionally understate the initial estimated cost, artificially overstating the indicators for the effectiveness of the construction to be commenced. This subsequently complicates its planning and realization. For example, the title list for the Volenskaya Building Materials Plant for 1979 provided for the completing of capacity to turn out 20 million bricks a year with an estimated cost of 699,000 rubles for the plant. However, the capacity was not completed on time, and was not planned in the 1979 title list. A check established that the ministry had revised the design and estimate specifications, and had increased the cost by 1,019,000 rubles, that is, by more than double. The original artificial understatement of the estimated cost was to blame for this. It must be pointed out that initially the estimated cost of the plant had been set in the plans at 1,671,000 rubles, but under the proposal of the commission of experts at the ministry, this was reduced to 699,000 rubles. Unfortunately, analogous violations are permitted by many ministries and departments, and this reduces capital investment effectiveness.

Thus, the poor quality of the design and estimate specifications and delayed submission to contractors worsen capital investment planning, they impede the organization of construction, they draw out the construction time and the completion of capacity, and ultimately reduce capital investment effectiveness. In addition they fall negatively upon the economy of not only individual enterprises and organizations, but also the national economic sectors.

In our opinion, an improvement in the estimates holds a special place in stabilizing the estimated cost. This is a complicated interdisciplinary problem which, along with an improvement in the system of estimate rates and prices for the subjects and implements of labor, requires a rise in the scientific level of estimating work and norm setting, the use of mathematical economic models and computers with the broad application of the actually required proportional expenditures for constructed progressive projects.

The stability of the estimated costs will make it possible to solve the problems of improving planning work, of accelerating the completion of production capacity and projects, of raising capital investment effectiveness, as well as strengthening cost accounting and the role of economic levers and incentives. For this, in the period of the entire investment process, in our view, it is essential to systematize the planning of design and research work, as well as raise the responsibility of the clients for the projects being designed.

The clients should be more responsible for the reliability and promptness of submitting initial data to the design organizations. In the aim of

improving the responsibility of the design organizations for controlling and supervising the construction, the rules must be revised dealing with contracts for design and construction work, laying provisions penalties in them for the failure to meet the dates and for poor quality documents.

It is also advisable to alter the existing bonus schemes. Responsibility for the quality of the designs would be significantly increased if the bonuses would be paid, for example, in two parts. The first (as an advance) during the year of completing construction, and the second after the enterprise was in operation. Here the second part of the bonus would not be paid if in the course of construction the design and estimate specifications were revised upwards due to the fault of the design organization. Moreover, it makes sense to have the design and estimate specifications which would increase the estimated cost be approved without fail by the Minister and Ministry of the USSR (or the China republic), regardless of an improvement or deterioration in the previously approved technical and economic indicators for the projects.

The designing and price formation standards must also be systematized. The experience of building the most diverse enterprises and installations makes it possible to create all the conditions for generalizing and analyzing the technical and economic indicators, and on the basis of these, to work out unambiguously standards for proportional capital expenditures. From the latter, during the stage of the feasibility study and the preliminary (sketch-stage) design it would be possible to determine the cost of construction with greater accuracy. The prices for equipment, including imported, should be determined using reliable data, and for covering possible deviations, in the summary estimates provision must be made for increased rates for unforeseen expenditures, with provision for using these in the construction process only upon a joint decision of the design organization, the client and the financing bank.

CONTINUED: "PROBLEMY STROIT", 1980

Construction Working Capital

Zhurnal SVETLO I ZVUK in Russian No 5, 1980 pp 77-76

[Review by Candidate of Economic Sciences E. M. Katrik of the book "Kak organizovatsya kapital'nogo stroitel'stva" (Working Capital of Capital Construction) edited by D. S. Molyshev and M. A. Penev, Stroyizdat, Moscow, 1977, 136 pages]

[Text] The improvement in planning and economic incentives for construction is introducing new features in the system of organizing working capital. The amount of capital is increasing, the structure is changing, and changes are occurring in the financial sources for forming working capital. The reviewed monograph is devoted to these questions. A distinguishing feature of the work is that the collective of authors has made an attempt to investigate these questions on a scale of all capital construction, and

not just in the process of the use of working capital by the contracting organizations.

The book's structure corresponds to the set goal, that is, to study the nature of the working capital of capital construction, to study the changes in its structure and sources of formation, and to work out proposals on improving planning, setting rates for working capital and its financial sources under the conditions of payments for completed projects and start-up expenses.

The publication consists of six chapters, the first of which reviews the content of working capital, its circulation in relation to the technical and economic features of capital construction, and the various functions of the participants in the investment process, that is, the client and the contractor, as well as the organization of payments; it also takes up the dynamics and structure of working capital.

The authors, in reviewing the circulation of capital for the contractor, have taken up a very debatable theoretical position on the concept of "finished product" in construction, in assuming that the submission for acceptance of a completed stage of work or individual structural elements and the payment for them by the client are simultaneously the act of selling the "product" and the concluding stage of the circulation of the capital of the contracting organization. As a result, the conclusion is drawn that the payment procedure in construction has a direct influence on the stage of the circulation of capital for the contractor.

However, such an intermediate system of payments somewhat distorts the circulation of capital for the contracting organizations. Depending upon the current payment procedure in capital construction, there is a transference of the value of the completed amount of work from the balance sheet of the contractor to the balance sheet of the client and the payment for this work by the latter. Externally this phenomenon assumes the form of the sale and completion of the circulation of capital for the contractor. But in reality, this work is only individual elements of the project under construction or a part of incomplete construction.

It is submitted that the circulation of the capital ends precisely for the contractor with the putting of the completed project into operation and with the receipt of payment from the client, and not in the construction as a whole, as the authors of the book feel.

We share the view of the authors on the content of working capital in construction as a unified category regardless of the placement of this capital among the participants of the investment process.

A detailed analysis of the dynamics and structure of working capital in capital construction over a number of years has made it possible to determine substantial changes in the capital, as well as provide an economic evaluation of the reasons for these changes.

Having reviewed the general theoretical questions of working capital, in the second chapter the authors move on to an analysis of this capital among the contracting construction organizations. In using extensive numerical material both for the contracting organizations and for the other national economic sectors, for example, industry and agriculture, a number of interesting estimations and deductions is made.

A detailed analysis of the state of production inventories and their dynamics for the construction contracting organizations as well as a study of the structural changes which have occurred in recent years have allowed the authors to critically assess the current instructions on setting the working capital rates for the state contracting organizations, and to work out a new procedural approach to setting the rates for production inventories. The proposed procedure for a consolidated calculation of the rates exhibits in simplicity and accessibility as well as in the possibility of using it in providing bank control over the effective use of the working capital.

The third chapter of the reviewed publication is devoted to a study of the most important element of working capital for the contracting organizations, incomplete production. In truth, in analyzing its state over a number of years, the authors assert that "under the influence of the growth of incomplete production caused by the introduction of the new payments, all working capital has significantly increased both as a whole for the national economy and for construction particularly" (p 51).

At first glance, such an argument seems strange, as it is incomprehensible how the movement of incomplete construction from the client's balance sheet to the contractor's balance sheet could cause a rise in working capital. If the authors here were pointing out that for the clients incomplete construction is not reflected in the statistical reporting as working capital (as, incidentally, is stated at the beginning of the monograph on p 10), then the reasons for such an increase would be clear to the reader.

The introduction of progressive payments in fact has led only to a change in the place of accounting for expenditures relating to the construction of the project. While with intermediate payments the expenditures on incomplete production of construction-installation work amounting to the payment made by the client would shift from the contractor's balance sheet to the client's balance sheet, under the conditions of payments for complete projects and starting-up complexes, these expenditures are shown on the balance sheet of the contracting organization as part of the working capital for incomplete production.

Thus, the procedure for accounting for the expenditures cannot, in our view, determine the growth rate of the working capital in construction, and all the more for the national economy as a whole.

In this chapter the author collective examines the questions of setting the working capital rate for expenditures in incomplete production, in

critically assessing the viewpoints existing in the economic literature on the question of the methods of setting these rates.

In speaking about the bases for scientific rate setting for incomplete production, the authors take into account its dynamics which is influenced by the particular features of construction work, and arrive at the correct conclusion that the transition to payments for finished projects and complexes ready to produce products would everywhere halt the growth of incomplete production for the contractor. However, here the authors should also consider the estimated cost of the erected projects, which has direct bearing on its cost. The arguments given by the authors in backing up the methods worked out by them for setting the rates for incomplete production are very convincing. The methods proposed by the authors for setting the expenditure rates, like the procedure for setting the rates for production inventories, differs from the existing ones in its simplicity and accessibility for economists of all levels and subdivisions.

The fourth chapter analyzes the working capital of the clients, its structure and dynamics, as well as the role of the financial and credit mechanism in increasing its efficient use.

Here the authors make a number of interesting proposals, the introduction of which would help to raise the incentive role of bank credit and the capital payment. Worthy of note are the proposals to bring into conformity the procedure for calculating the average annual value of productive capital in determining the level of calculated profitability and in calculating the capital payment; to revise the system of accounting for expenditures on the purchase of equipment and the procedure for crediting this.

The fifth chapter of the monograph entitled "The Turnover Rate of Working Capital in Capital Construction" examines the questions of accelerating the turnover rate of working capital. The authors, in critically viewing the current method of calculating the turnover rate of working capital, in our view, correctly consider it essential in the calculation to consider the incomplete production which is a component element of the working capital. The book proposes three indicators for the turnover rate: the turnover rate of all working capital; the turnover rate of normed working capital or capital in the production sphere; the turnover rate of capital tied up in incomplete production.

Of definite interest is the review in this chapter of the influence of bank credit on accelerating the turnover rate of working capital, and in particular, the role and importance of payment credits.

The effective use of working capital to a significant degree is determined by the sources of its formation. The sixth, concluding chapter of the reviewed book is devoted to these questions. This chapter contains a number of debatable questions. Here the structure of the sources of working capital is analyzed as a whole for construction as well as for the clients and contractors. A comparative analysis is given of data on the structure of

the sources of working capital for industry and construction. There is a detailed examination of the existing structure of the sources for forming incomplete production of construction-installation work (the norm and the actual balance), as well as for production inventories. The elaboration of these questions by the authors merits attention, although the conclusions and proposals on them are not indisputable.

As a whole, regardless of the above-indicated comments, the reviewed work is serious research on disputed problems of organizing working capital in capital construction. The book has been written on a rather high theoretical level, it contains extensive factual material, and is well written. The proposals are of practical interest.

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Net Product Rate for Construction

Moscow STROITEL'NAYA GAZETA in Russian 13 Jul 80 p 2

Article by A. Kul'ba, sector head and Z. Malashkina and N. Mayevko, senior scientific coworkers of the Scientific Research Institute for Construction Economics of the USSR Gosstroy: "A Sectorial Standard";

[Text] The enterprises of the construction industry and the ministries are working out the net product rates (NPR) for a mass transition to planning and evaluating their operations using the new indicator.

An experimental check on the NPR indicator at a number of enterprises has made it possible to check out the economic content of the NPR indicator and at the same time disclose its advantages and shortcomings. All of this was considered in the course of elaborating the sectorial procedural instructions which have been submitted to the USSR Gosstroy.

The procedural instructions define a uniform procedure for drawing up and approving the net product rates, and their use in the system of indicators for planning and evaluating the operations of the ministries (departments), associations and enterprises of the construction industry. For example, the elaboration of the NPR for reinforced concrete products (price list 86-88) is being carried out consecutively in three stages: by the plants manufacturing the product, by the ministries (departments) which have construction industry enterprises, and, finally, by the organizations which work out wholesale prices.

For this purpose, forms were sent out to the reinforced concrete products plants, and these forms contained the necessary initial materials for working out and submitting them to the superior ministries (departments) as well as to the NIIES [Scientific Research Institute for Construction Economics] of the USSR Gosstroy. Presently the ministries and institutes are continuing to receive materials from the enterprises. However, certain

plants are submitting only partially filled-out forms, tables and calculations, while others have limited themselves to calculating a coefficient which describes the ratio of the wages of the industrial-production personnel engaged in management and the servicing of production to the wages of production workers. Individual plants have sent in materials only for the ministry (department) or only for the NIIEB, although it is known that it must be submitted to the two recipients.

Merely excerpted and incompletely submitted data impede the generalization, analysis and elaboration of the draft departmental and sectorial net product rates.

The draft NPR worked out by the ministries should be based upon the average sectorial cost, including average sectorial wages. They are being set proceeding from the volume of the articles produced in the sector, and then for the ministry as a whole (not lower than 80-85 percent of the total output for the given type of product). The profit to be included in the NPR is calculated according to the sectorial profitability rates approved in relation to costs minus direct material outlays. For example, for the reinforced concrete products included in the price list 06-08, the rate has been set at 41 percent.

The materials submitted for the elaboration of the sectorial NPR should reflect the proposals of the ministries and departments concerning the conditions for subcontracting arrangements between the enterprises. With the substantial differences in the specific conditions from the nonsectorial ones which consider the differences in the level of labor expenditures, these conditions will be considered in the calculating of the NPR.

The ministries and departments, having obtained the initial material from the enterprises of the construction industry, should make certain that it is reliable, and they should analyze in detail and calculate the departmental draft rate. Here the plants, ministries and departments calculate the draft rate per cubic meter of product in a solid body using the groups of products from the price list. The NIIEB is working out a sectorial rate per price-list unit, as well as corrections for it which consider the regional wage coefficients.

The sectorial rates for metal structural elements, wood and aluminum elements, parts and materials produced by the construction industry enterprises will be worked out for the entire range of articles provided for in the corresponding price lists.

In the sectors where zonal wholesale prices are used, the NPR are to be set for the zones. For example, the wholesale prices for logs, sawed lumber, ties and so forth are set in terms of consumption zones. The wholesale prices for door and window units are set for the manufacturer zones. The same principles should be employed in determining the NPR.

The new wholesale prices are to be put into effect on 1 January 1981. It has been proposed that the construction industry enterprises convert to the planning and evaluating of their operations using the NPR indicator as of 1 January 1981. For this purpose, in the current wholesale prices the ministries must isolate the NPR, in being guided by the sectorial procedural recommendations.

The Ministries (departments) should ensure the economic soundness of the rates being worked out, the reliability of the materials submitted by them for establishing the sectorial NPR, and in addition--and this is equally important--the correctness of using the NPR at subordinate enterprises (associations). It must be remembered that the NPR which have been approved in violation of the current procedure are to be canceled, and the indicators, including the fund-forming ones, are to be recalculated in the established procedure.

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CONSTRUCTION

DEVELOPMENT OF HOUSING CONSTRUCTION IN WESTERN SIBERIA DISCUSSED

Moscow STROITEL'NAYA GAZETA in Russian 3 Sep 80 p 3

[Interview with Nikolay Aleksandrovich Serov, deputy minister of the USSR Ministry of the Timber and Wood Processing Industry: "Much Waits To Be Done"]

[Text] For the development of the Western Siberia oil and gas complex a program of accelerated housing construction has been planned in this region. First of all, the overall development of an industrial housing construction base for the USSR Ministry of the Timber and Wood Processing Industry--the principal provider of comfortable housing--has been stipulated.

Our correspondent O. Pakhomova discusses ways of realizing the long-term program with N. Serov, deputy minister of the USSR Ministry of the Timber and Wood Processing Industry.

[Question] Nikolay Aleksandrovich--several words concerning the current production volumes of wooden houses for the Western Siberia oil and gas complex and the outlook for increasing their output in the near future.

[Answer] In 1979 the USSR Ministry of the Timber and Wood Processing Industry provided about 300,000 square meters of living space in houses in this region. The results of the work of our enterprises after seven months provide a basis for supposing that the plan for this year--about 860,000 square meters of total living space in panel and square beam houses and 2,000 modular section housing units--will also be fulfilled. By 1983, it is expected that these volumes will be increased to 1.1 million square meters and 13,000 modular section housing units, respectively. I will note along with this that the production of square beam houses will be reduced each year and in the near future the more advanced panel and modular housing units will comprise approximately 70 percent.

[Question] Could you not speak more in detail about modular section housing units?

[Answer] Wooden modular section houses are erected from modules with dimensions of 3 x 6 meters and with a weight of 4 tons. Practically speaking,

this is a finished shell of a house which is convenient to transport. The modular section may be delivered to the construction and assembly site by helicopter, on sleighs, by motor vehicle transport, ships, or on the railroad. The modular section rooms come off of the assembly line completely factory finished. Plumbing equipment has been installed in them, electrical and radio wiring has been completed and there is built-in furniture.

Last year we supplied about 200 such buildings to the Western Siberia oil and gas region and to our timber managements. They received a high evaluation from specialists and residents. We are turning out just as many modular section rooms now also and in 1981 there will already be 6,000 such shells.

[Question] Apparently, the climate determines the selection of materials and structural forms also?

[Answer] It goes without saying: houses for the Western Siberia regions are designed for temperatures up to minus 50°. In accordance with GOST [State Specifications] the thickness of panels and slabs are increased in them and improved heat insulation is specified. Now three of our plants have put into production three-pane windows. Another five enterprises are preparing to transfer over to turning them out.

[Question] It would be nice to know how many combines are manufacturing homes for Western Siberia at the present time?

[Answer] Six. But by next year already there will be eleven. In particular, Vyatsky-Polyany and Pyshma housing construction combines will be turning out modular section housing units that are new for them. New production has to actually be built up for this. The approximate total estimated cost of reconstructing each of these combines has been determined at 20 million rubles. Two million rubles has been set aside already during the current year for these aims. Unfortunately, the general contractor of the construction and assembly work--the Ministry of Construction of Petroleum and Gas Industry Enterprises--despite the availability of design and estimate documentation, is moving very slowly. If things move along further at the same rates then reconstruction of the combines will be completed in no less than ten years.

During this year we expect to complete reconstruction of the Biryusinsk, Talitsa and Yushala combines.

[Question] All of this provides a basis for supposing that the factory preparedness of articles will improve?

[Answer] Yes. Our panel buildings are still only 50 percent finished. After completing construction and reconstruction of the enterprises and, in particular, after forming stations for finishing and trimming structural forms, these indices will reach 75 percent. We will complete finish work, install plumbing equipment, etc. in plant shops.

[Question] You touched on an important problem of completely equipping homes with everything that is required. What has already been done along this line?

[Answer] Not much yet. We install plumbing equipment and implement the outfitting with pipe stocks in only a third of our panel houses that come off the assembly line. By 1983 we have to completely equip all panel houses. We have worked out special regulations for this which are now awaiting approval. In addition, at the present time specialists in our ministry are discussing with consumers at what level they want to have the houses equipped in the next three years.

[Question] And what can be said about the organization of master-assembly work--also a new form of organization of production for your ministry?

[Answer] We have some experience with master-assembly work at the Perm', Novovyatsk and Talitsa housing construction combines. There, small crews of six to ten qualified workers with various specialties were formed. They go to the sites where homes must be built, and talk with and show builders how to assemble housing units.

We try to use the accumulated experience at other combines as well. Now all of our plants that manufacture homes for Western Siberia must use the master-assembly method. With this goal we expect to organize such crews at each DSK [Housing Construction Combine]. In addition, we are working out special regulations concerning these collectives and coordinating the requirements of the conditions for the master-assembly method and wages for work.

An overall approach toward implementing the planned program as a whole will make it possible for the USSR Ministry of the Timber and Wood Processing Industry to successfully meet the established goal--to provide Western Siberia oil industry workers with the necessary number of high quality housing units.

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CONSTRUCTION

NEW PRODUCTS REVIEWED

Arbolite Panel Houses

Moscow SEL'SKOYE STROITEL'STVO in Russian Aug 80 p 15

[Article: Houses from Arbolite Panels]

[Text] Original designs for farmstead-type housing units with walls from arbolite panels have been developed at the "Leningrad Civil Design" Institute.

Satisfying the requirements for an agricultural housing unit was made the basis of the designs. Besides single-story three-room houses and five-room houses with an attic, the erection of a farm building for keeping livestock and structures for storing means of transportation on the personal plot have been specified by the design.

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Perlitic Cement Slabs

Moscow SEL'SKOYE STROITEL'STVO in Russian Aug 80 p 23

[Article: "Perlitic Cement Slabs"]

[Text] The production and technical firm "Siborggazstroy" is exhibiting perlitic cement slabs at the "Gas Industry" pavilion which they developed and are manufacturing which are for heating floors, roofs, lightened brick walls, for fillers in reinforced concrete and brick panels, for making partitions between rooms and apartments and other purposes.

In order to obtain 1 cubic meter of products, 1.5 cubic meters of expanded perlitic sand with a total mass of 120-150 kg per cubic meter, 350 kg of portland cement of at least grade 400, and 350 liters of water are used.

The slabs with dimensions of 70 x 50 x 10 cm have strength limits during compression of 30 kilogram force per square centimeter and a heat conductivity coefficient at 20° of 0.10-0.12 large calories per meter hour degree.

The formed slabs are thermally treated in three stages: raising the temperature between 65° and 90° for 3 hours, isothermal initial heating for 6 hours and reducing the temperature for 3 hours.

The cost of 1 cubic meter of this effective structural heat insulating material comprises about 65 rubles.

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Slabs for Lining Canals

Moscow SEL'SKOYE STROITEL'STVO in Russian Aug 80 p 24

[Article: "Large Scale Slabs for Lining Canals"]

[Text] The use of large scale NPVK [expansion unknown] slabs with dimensions of 6 x 2.74 x 0.08 meters and a weight of 3.25 tons lowers the number of joints by a factor of 1.5, reduces the time and cost of construction by means of reducing the consumption of reinforcing, and uses technological equipment more efficiently. Designed to be installed as the prefabricated monolithic lining of main and inter economy canals that are filled to a depth of up to 5 meters, with the height of waves no greater than 1 meter and with ice thickness up to 80 cm, they have a frostproof feature of no less than 150 and are made from grade 400 concrete.

The slabs were developed in the V/O [All Union Association] of the "Union Water Resources Design" and are produced at the Engel's reinforced concrete components plant No 6 in Main Administration for Construction of Water Projects in Middle Volga under the USSR Ministry of Land Reclamation and Water Resources. They are appearing as exhibits at the "Land Reclamation and Water Resources" pavilion.

The reinforcing rods that stick out along the perimeter make it possible to form uniformly durable, homogeneous, rigid joints from fine-grained concrete on expansive cement by a pneumatical spilling method or by vibrating the concrete mixture. The volume of concrete in a slab is 1.3 cubic meters--the steel consumed is 119 kg.

The slabs are reinforced in the longitudinal direction by prestressed reinforcing rods with a diameter of 10 mm, class At-V and in the transverse direction with those of the same diameter, class A-III.

Where the cost of installing 1 square meter of canal lining using NPVK slabs comprises 7 rubles 64 kopecks, then when accomplishing this work with P-1 slabs with dimensions of 2.8 x 2.8 x 0.10 meters that have 2 rows of reinforcing rods that stick out along the perimeter, the cost came to 9 rubles 20 kopecks at sites of the Main Administration for Construction of Water Projects in Middle Volga.

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Moscow SEL'SKOYE STROITEL'STVO in Russian Aug 80 p 24

[Article: "An Effective Frostproofing Admixture"]

[Text] When laying out the subbase for a road surface made of lean concrete, the introduction of ammonia water makes it possible to lengthen the duration of the construction season, to prepare a concrete mixture without additional heating of the stony materials, and to operatively regulate the composition of the mixture depending on the air temperature.

This method was used by DSU-2 [Road Construction Administration-2] workers in the Kemerovo Administration for Construction and Maintenance of Roads in collaboration with Giprodorniya.

Ammonia water is a chemically-produced product which has a low cost and is delivered to the DSU-2 cement and concrete plant by railroad transport in special tanks. The concentrated frostproofing admixture (25 percent concentration) is stored in an hermetically sealed container with a lid and pipes with shutoff hardware for filling and emptying the contents. The ammonia acid is transferred by an EK-9A pump.

The working concentration (consistency), depending on the actual moisture content of the filler being used and the calculated negative temperature, is controlled with the aid of a hydrometer no less than 2 times in 24 hours.

Lean concrete may be prepared in forms that have a negative temperature but without frozen lumps. The concrete is delivered to the site where it is to be placed by dump trucks with a tarpaulin covering so that the ammonia does not evaporate from the mixture and so that snow does not get in there. Evaporation of the ammonia during the course of 14 hours is retarded by a protective film of coal tar--a waste product of the coke industry--which is deposited on the concrete surface.

With negative temperatures the lean concrete is placed on the frozen subbase which is cleaned of snow for the length of the area that will be worked on during the shift and compacted by a concrete finishing machine after two to four passes. Rolling is done by lightweight motorized rollers after 5 to 6 passes per single lane, then by a heavy one (8 to 10 passes per single lane) and finally by a pneumatic roller. All of this work is accomplished during one work shift.

The economic effect of laying a subbase from lean concrete with negative temperatures by using ammonia water comprises 65,200 rubles per 4 km of road.

More detailed information may be obtained at the "Highway Construction" pavilion.

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CONSTRUCTION

DRAFT HOUSING LAW DISCUSSED

Tselinograd PREUNDSCHAFT in German 13 Aug 80 p 4

[Article by lawyer Viktor Schmidt: "Discussion of Housing Legislation"]

(Text) "The citizens have the right to housing space..."
(Art 44 of the USSR Constitution).

The constitution stresses that in our society of the true democracy, an ever more active participation of the working people in the life of the state has been secured. This end is served also by the publication of draft laws and their discussion by broad strata of the population. Thus in many enterprises and institutions of our republic, as throughout the entire country, the draft law "Foundations of Housing Legislation of the USSR and the Union Republics" (see PREUNDSCHAFT, No 96, 16 May 1980) is presently being discussed.

Amended on the basis of the observations and proposals of the Soviet citizens, the foundations of Housing Legislation are to become valid law and will improve the resolution of disputes in the area of legal relations relating to housing. (Observations and proposals on the draft are to be directed to the Kazakh SSR Ministry of Justice in Alma Ata.)

The Foundations of Housing Legislation are to unify the various individual normative laws presently valid and to determine the competencies of the USSR and the union republics in the regulation of housing questions and legal relations.

The draft supplements the housing legislation valid in the Kazakh SSR by a number of important new regulations.

Thus, Article 25 of the Foundations states that in the allocation of apartments a single room may not be assigned to individuals of different sexes over the age of 9 years, with the exception of married couples. This is of great importance for the responsible officials in the solution of housing questions.

The Foundations determine the rules for the registration of citizens in need of an improvement in their housing conditions and the rules for the allocation of apartments.

All those cases are specified in which one has the right to be supplied with an apartment on a priority basis. This applies to invalids of the Great Patriotic War, families of those who died in action during the war, heroes of the Soviet Union, heroes of socialist labor, individuals suffering from serious chronic illness, invalids of labor of the first and second groups, veterans of labor, families with a large number of children, families headed by a woman and families with twins.

The Foundations stress the legal significance of the housing allocation document. It is considered the only document which confers the legitimate right to move into an apartment in the buildings owned by the state and social housing funds. According to the new draft law, a written rental agreement is now to be concluded between the renter and the housing administration on the basis of this housing allocation document, whereas in past practice this agreement was concluded only in oral form.

The Foundations specify the right of the renter who has housing space exceeding the fixed norm to demand a smaller apartment from the executive committee of the local soviet or the enterprise (depending on the jurisdiction to which the building belongs). In addition, it has been determined that the rent for excess housing space may be raised in the buildings belonging to the state housing fund only if this excess is larger than one-half of the norm per person--that is, 4.5 square meters.

It should be stressed here that the right of citizens who are temporarily absent for a period of 6 months to retain their living space does not extend to families who have chosen another permanent residence. For persons living in the buildings of housing cooperatives, the right to retain the apartment in case of temporary absence is not constrained to 6 months. But there exist certain exceptions, as this period may be longer also for state housing space; the draft provides rules for specific situations. Further, the procedure for the exchange of apartments is outlined precisely. Thus, a refusal of permission for an apartment exchange possibility can be appealed through the courts.

The list of individuals who can be evicted, with simultaneous allocation of another apartment, has been expanded. For instance, this applies to citizens who have apartments in kolkhoz buildings and have been expelled from the kolkhoz or have left it voluntarily.

Another innovation should be mentioned. Our socialist state puts a particular value on the labor of those people who have exercised a given profession for many years without changing their place of work. For this reason such persons cannot be evicted from service apartments. This

reflects the trend toward combatting cadre turnover and care for the welfare of the working man in our state.

He who has carefully read the draft of the "Foundations of Housing Legislation of the USSR and the Union Republics" must have become aware of the following: Once again it is being confirmed here that realization of the citizen's rights is indissolubly tied to the fulfillment of his duties. "The citizen of the USSR is obligated..., to observe the rules of socialist communal life and to prove himself worthy of the high name of a citizen of the USSR," states Article 59 of the USSR Constitution. This applies also to the apartment renters, who must make proper use of the apartments assigned to them.

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CONSTRUCTION

INSTITUTE OFFICER DESCRIBES NEW CEMENT ADDITIVE

Moscow STROITEL'NAYA GAZETA in Russian 29 Aug 80 p 3

[Article by A. Zdorov, deputy director of the Southern state project and scientific-research institute for the cement industry and candidate of technical sciences: "Get Acquainted With: Krent; A New Type of Alloying Additive Makes It Possible To Achieve Production With Preset Properties"]

[Text] The production of cement occupies a special place in the building materials industry: construction is supported by it. Thus, the output of it increases with each year. The Ukraine alone puts out more than 20 million tons of cement per year. But does this valued production always meet the growing demands of builders? Now, during the erection of various structures, high speed methods are being used more and more extensively and high grades of portland cement are needed for this. Unfortunately, as yet there is no reason for praise--just a little more than one percent of the cement being produced is grade "550" and "600."

Builders also receive little of special types of cement--self-stressing, expansive, decorative and highway. In the meantime, science has discovered and continues to discover newer and newer long-term methods of accelerating technological progress in the major building materials industry. One of them is the use of various admixtures. The effectiveness of their use has been convincingly proved by practice. Say, for example, with the introduction of 50 percent granulated blast furnace slag energy consumption is reduced sharply--almost by one third.

But it must be stated with regret that this tested method is not actively used everywhere. And as a result there is an over consumption of clinkers and energy resources. Thus, for the output of grade "400" cement at the Balakleya combine only 37 percent slag is put in, whereas GOST authorizes up to 60 percent to be added. Even fewer admixtures are introduced at the Kamenets-Podol'skiy plant.

But this work--good or bad--is still with traditional admixtures. And yet there are also new ones that make it possible to improve quality and expand the selection of special types of cement. One could note, for example, the development of the structure and technology for the production of a

sulfoalumosilicate product--krent. Tests show that its use not only substantially increases the strength characteristics of cement but also makes it possible to organize the output of especially quick-setting, expansive, self-stressing and other types of adhesives without converting technology or increasing energy consumption.

Krent is an alloying admixture which makes it possible to obtain materials with properties that are fixed beforehand. Thus, the use of krent during the production of slag portland cement makes it possible to turn out grade "300" instead of "200" with the same ratio of clinkers and slag. The introduction in all of only three to five percent krent gives grades "550" and "600" cement. For this the usual clinkers are used and it is not required that it be more finely ground. And if this admixture is increased to 12 to 18 percent and the content of gypsum is increased, expansive and self-stressing cement is obtained. Expansive cement, which is produced at our experimental plant, is being used with success for the construction of the subways of Khar'kov and other cities.

Krent is starting to be used at other enterprises as well. At the Amvroseyevka combine 50,000 tons of grade "600" cement from ordinary clinkers were manufactured during the course of the experiment. Planned tests have shown that production of the material for such a grade may be set here at up to 200,000 tons per year as well as expansive and self-stressing cement in large quantities. At the Zdolbunov combine up to one half million tons of grade "600" cement per year can be turned out in structurally outmoded furnaces. The use of sulfoalumosilicate produces considerable economic effect. At the Krivoy Rog plant, for example, it reaches 300,000 rubles per year.

Special types of slag portland cement are also being developed at the institute: quick-setting, sulfate resistant and others. The use, let's say, of quick-setting adhesive materials at a number of reinforced concrete components plants significantly reduced the steaming process and due to this saved hundreds of tons of fuel. Considering the deficit in sulfate resistant cements in the country, it is necessary to increase the production of sulfate resistant slag portland cement. In the Ukraine alone its output may be upped to a half million tons per year during the next two years and by the end of the 11th Five-Year Plan to a million tons. The advantage here is evident--30 percent less energy resources are expended for the production of special types of slag portland cement than for portland cement, not to even mention the other advantages.

Work is also being done for a more extensive use of power plant ashes in the industry. Numerous experiments have shown that mixing ashes with cement in a blower is accomplished quite quickly and with high quality.

Practice confirms that the use of admixtures is a profitable and promising business. They make it possible to increase the production of special types of cement, improve their quality and reduce the consumption of fuel and

energy resources. It is necessary for the USSR Ministry of the Construction Materials Industry to organize the industrial production of admixtures and of krent itself. In our view the ministry, together with Gosstroy and Gossnab, should review the selection of cement plant production while taking into consideration their use in various regions of the country. It often happens that the required grade is shipped through three to nine lands whereas it may be turned out at the site.

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